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Andrew C. Lewin

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EXAMINER

PUNNOOSE, ROY M

ART UNIT

PAPER NUMBER

2886

MAIL DATE

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01/08/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/534,495	Applicant(s) LEWIN ET AL.	
	Examiner ROY PUNNOOSE	Art Unit 2886	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 June 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-37 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 16 June 2009 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment and Arguments

1. Applicant's amendment filed on 06/16/2009 is acknowledged. The applicant has amended claims 1, 5, 13-15, 20-21 and 27 in response to the rejections of the previous office action. Claims 1-37 are pending in the application.
2. Furthermore, it is noted that the applicant has filed amendments to the specification and the drawings in response to the objections stated the previous office action. The Examiner has accepted the applicant's amendments of the specification and the drawings.
3. Furthermore, it is noted that the applicant has **elected *not*** to comply with the PCT format requirements, except for the title, despite repeated indication of such in previous office actions. The PCT format requirements, specifically about the ***Description/Specification***, and the ***headings***, were detailed in the last office action, and are shown again below as it appears in **MPEP 1823** for applicant's convenience.

1823 [R-5] The Description

PCT Article 5.

The Description

The description shall disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art.

PCT Rule 5.

The Description

5.1..

Manner of the Description

- (a) The description shall first state the title of the invention as appearing in the request and shall:
- (i) specify the technical field to which the invention relates;

*PCT Rule 5.**The Description*

5.1..

Manner of the Description

- (a) The description shall first state the title of the invention as appearing in the request and shall:
- (i) specify the technical field to which the invention relates;
 - (ii) indicate the background art which, as far as known to the applicant, can be regarded as useful for the understanding, searching and examination of the invention, and, preferably, cite the documents reflecting such art;
 - (iii) disclose the invention, as claimed, in such terms that the technical problem (even if not expressly stated as such) and its solution can be understood, and state the advantageous effects, if any, of the invention with reference to the background art;
 - (iv) briefly describe the figures in the drawings, if any;
 - (v) set forth at least the best mode contemplated by the applicant for carrying out the invention claimed; this shall be done in terms of examples, where appropriate, and with reference to the drawings, if any; where the national law of the designated State does not require the description of the best mode but is satisfied with the description of any mode (whether it is the best contemplated or not), failure to describe the best mode contemplated shall have no effect in that State;
 - (vi) indicate explicitly, when it is not obvious from the description or nature of the invention, the way in which the invention is capable of exploitation in industry and the way in which it can be made and used, or, if it can only be used, the way in which it can be used; the term "industry" is to be understood in its broadest sense as in the Paris Convention for the Protection of Industrial Property.
- (b) The manner and order specified in paragraph (a) shall be followed except when, because of the nature of the invention, a different manner or a different order would result in a better understanding and a more economic presentation.
- (c) Subject to the provisions of paragraph (b), each of the parts referred to in paragraph (a) shall preferably be preceded by an appropriate heading as suggested in the Administrative Instructions.

*PCT Administrative Instructions 204.**Headings of the Parts of the Description*

The headings of the parts of the description should be as follows:

- (i) for matter referred to in Rule 5.1(a)(i), "Technical Field";
- (ii) for matter referred to in Rule 5.1(a)(ii), "Background Art";
- (iii) for matter referred to in Rule 5.1(a)(iii), "Disclosure of Invention";
- (iv) for matter referred to in Rule 5.1(a)(iv), "Brief Description of Drawings";
- (v) for matter referred to in Rule 5.1(a)(v), "Best Mode for Carrying Out the Invention," or, where appropriate, "Mode(s) for Carrying Out the Invention";
- (vi) for matter referred to in Rule 5.1(a)(vi), "Industrial Applicability";

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4. With regard to the objection of claim 13 as detailed in the previous office action, the Examiner has accepted applicant's amendment of claim 13 to correct the deficiencies.

5. With regard to the 35 USC 112 rejections of the previous office action, the Examiner has accepted all of applicant's amendments of the claims to correct the deficiencies.

6. Newly amended claim 1, and its dependent claims, claims 2-37 are directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

Originally filed claim 1 was directed to **a structured light generator for illuminating a scene**. Newly amended claim 1 is directed to a structured light generator for illuminating a scene such that the light reflected from the scene can be imaged to provide range information. The originally filed claims 1-37, did not have the limitation **light reflected from the scene can be imaged to provide range information**. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, the newly amended claim 1, specifically the part that states "such that the light reflected from the scene can be imaged to provide range information" **has been withdrawn from consideration as being directed to a non-elected invention**. See 37 CFR 1.142(b) and MPEP § 821.03.

The applicant's argument with regard to claim 1 has **not been accepted** because the applicant's argument is that claim 1 has been amended to represent a structured light generator for illuminating a scene such that the light reflected from the scene can be imaged to provide range information which is not taught by prior art Kuchitsu. The applicant is reminded that the originally filed claim 1 was directed to **a structured light generator for illuminating a scene**.

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Newly amended claim 1 is directed to a structured light generator for illuminating a scene such that the light reflected from the scene can be imaged to provide range information. In the originally filed claim 1, or in any of its dependent claims 2-37, there was not even a hint of **imaging light reflected from the scene** for **providing range information**. Since applicant has received an action on the merits for the originally presented invention, the originally presented invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, the newly amended claim 1, specifically the part that states “such that the light reflected from the scene can be imaged to provide range information” **has been withdrawn from consideration as being directed to a non-elected invention**. See 37 CFR 1.142(b) and MPEP § 821.03.

7. With regard to amended claim 1, the applicant's arguments presented in the amendment filed on 06/16/2009 are moot because amended claim 1 has been withdrawn from consideration as being directed to a non-elected invention for reasons detailed in paragraph 6 above.

8. With regard to claims 2-37, the applicant's arguments presented in the amendment filed on 06/16/2009 are moot because they are dependent on amended claim 1 which has been withdrawn from consideration as being directed to a non-elected invention for reasons detailed in paragraph 6 above.

9. Applicant's arguments presented in the papers filed on 06/16/2009 are with regard to the amended claim 1 (which has been withdrawn from consideration as being directed to a non-elected invention) and not with regard to the original claim 1. **Because the applicant has not presented any arguments with regard to the rejection of the original claims 1-37 detailed in the previous office action, it is considered that the applicant has accepted the rejections of**

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the original claims 1-37 detailed in the previous office action, which are re-presented below for applicant's convenience.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1, 2, 3, 6, 9, 16-18, 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by KUCHITSU (JP 62007019 A).

12. Claim 1 is rejected because Kuchitsu teaches of:

A structured light generator (**see Fig.1**) for illuminating a scene **5** comprising;

a light source **3, 6** (see Figures 1 and 2) arranged to illuminate part of the input face of a light guide **1a**, the light guide **1a** comprising a tube having substantially reflective sides; and,

projection optics **4** arranged together with said light source **3, 6** and said light guide **1a** so as to project an array of distinct images (**see Fig.3**) of the light source **3, 6** towards the scene **5** (**see abstract**).

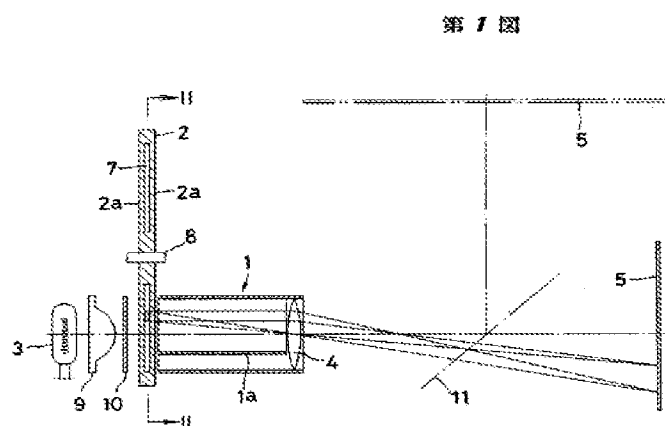


Figure 1. Structured light generating apparatus (JP 62007019 A)

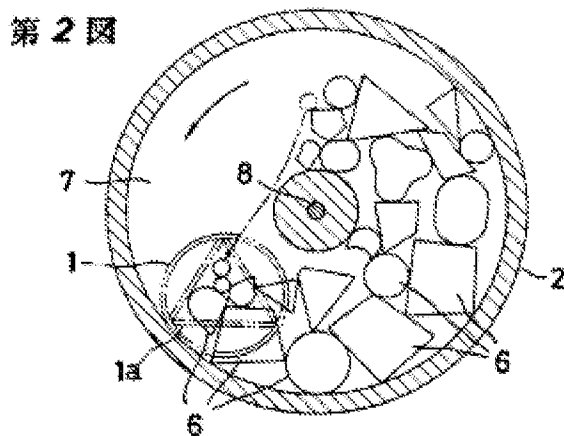


Figure 2. Structured light generating apparatus (JP 62007019 A)

Note: It is noted that colored transparent small chips 6 in combination with lamp 3 effectively forms a source of light to illuminate part of the input face of the light guide 1a having reflective sides.

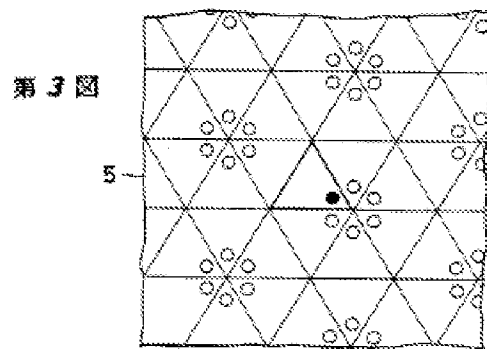


Figure 3. Array of distinct images (JP 62007019 A)

13. **Claim 2** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the light guide comprises a tube having a constant cross section. Kuchitsu discloses that the light guide is formed as a kaleidoscope in a cylindrical body **1** having constant cross-section (see abstract and Figure 1).

14. **Claim 3** is rejected for the same reasons of rejection of claims 1 and 2 as above and because Kuchitsu teaches that the cross-section of the tube is a regular polygon because three reflecting mirror surfaces **1a** are arranged as a kaleidoscope to form the light guide (see abstract and Figure 1).

15. **Claim 6** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the light guide comprises a hollow tube with three reflecting mirror surfaces **1a** and arranged as a kaleidoscope to form the light guide (see abstract and Figure 1).

16. **Claim 9** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the projection optics comprises a projection lens **4** (see abstract and Figure 1).

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17. **Claim 16** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches that the light source has a non-circular shape. It is evident from Figure 4 that the colored transparent small chips **6** which in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** have non-circular shape (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

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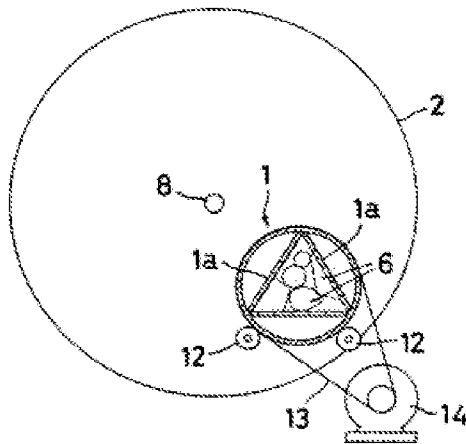


Figure 4. Structured light generating apparatus (JP 62007019 A)

18. **Claim 17** is rejected for the same reasons of rejection of claim 16 as above and because Kuchitsu teaches that the light source has a non-circular shape that is not symmetric about the axes of reflection of the light guide. It is evident from Figure 4 that the colored transparent small chips **6** which in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** have non-circular shape and not symmetric about the axes of reflection of the light guide (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

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19. **Claim 18** is rejected for the same reasons of rejection of claim 1 as above and because Kuchitsu teaches of more than one light source, each light source arranged to illuminate part of the input face of the light guide. It is evident from Figure 4 that the colored transparent small chips **6** which in combination with lamp **3** effectively form a source of light to illuminate part of the input face of the light guide **1a** (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

20. **Claim 21** is rejected for the same reasons of rejection of claim 18 as above and because Kuchitsu teaches of at least one light source emits light at a different wavelength to another light source (see second paragraph on page 9 of Kuchitsu translation).

21. **Claim 22** is rejected for the same reasons of rejection of claim 18 as above and because Kuchitsu teaches of at least one light source is shaped differently from another light source. It is evident from Figure 4 that each of the colored transparent small chips **6** *having different shapes* which in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** (see second paragraph on page 9 of Kuchitsu translation and Figure 4).

22. **Claim 23** is rejected for the same reasons of rejection of claim 18 as above and because Kuchitsu teaches that at least one light source has a shape that is not symmetric about a reflection axis of the light guide. It is evident from Figure 4 that each of the colored transparent small chips **6** which in combination with lamp **3** effectively forms a source of light to illuminate part of the input face of the light guide **1a** (see second paragraph on page 9 of Kuchitsu translation and Figure 4) and is not symmetric about a reflection axis of the light guide.

Claim Rejections - 35 USC § 103

23. **The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:**

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

24. Claims 14-15, 25-34 and 36-37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A).

25. Claims 14 and 15 are rejected because:

- A. Kuchitsu teach all claim limitations including *a projector lens* in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
- B. Kuchitsu teaches of only one type of projection optics/lens, and is silent on various other types of projection optics/lens that would provide a substantially focused image at a first distance and a substantially unfocussed image at a second distance in which the first distance may be larger than the second distance, in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
- C. The Examiner takes official notice that in view of Kuchitsu's teaching of one type of projection optics/lens, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Kuchitsu's projection optics/lens with an alternate type of projection optics/lens that would provide a substantially focused image at a first distance and a substantially unfocussed image at a second distance in which the first distance may be larger than the second distance due to the fact that such projection optics/lens would provide a depth of field suitable for desired focus field in a structured

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light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

26. **Claims 25-34** are rejected for the same reasons of rejection of claims 1-3, 6, 9 and 14-18 above and because the limitations claimed in claims 25-34 are either taught by Kuchitsu or are obvious variations of Kuchitsu's teachings or are well-known in the art or it would have been obvious to a person having ordinary skill in the art (PHOSITA) at the time the invention was made in view of Kuchitsu's teachings to incorporate said limitations into Kuchitsu's apparatus and method for improved accuracy in measuring an image plane, and it would have taken only ordinary engineering expedience and/or routine skill and/or experimentation for a PHOSITA to make minor modifications as needed to Kuchitsu's apparatus and method to obtain a desired result (see entire Kuchitsu patent). Furthermore Kuchitsu discloses the following (see second paragraph on page 9 of Kuchitsu translation):

Furthermore, besides using the colored translucent sheet-like small piece in the object in the present invention, a small piece with a picture, pattern and writing is suitable as well. In this case, when a plurality of types of small pieces with different colors, shapes, sizes and the like are combined, a pattern having further changes can be obtained. Moreover, besides this, a flash lamp, light-emitting diode and the like are incorporated in the object itself and used as a luminant and a pattern made by using light may be projected onto the screen.

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It should be noted from the above that Kuchitsu's colored transparent small chips 6 having different shapes would qualify under the broad term of "mask" and the rotating disc containing the colored chips would qualify under the broad term of "modulator".

27. **Claim 36** is rejected because:

- A. Kuchitsu teach all claim limitations except that the generator projects an array of images over an angle of between 50 degrees to 100 degrees in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
- B. Kuchitsu's apparatus comprises a lens 4 (see Figure 1) to project structured light exiting the light guide on to a scene/screen in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
- C. The Examiner takes official notice that in view of Kuchitsu's teaching of using a projection lens to project an image onto a scene/screen, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select or substitute Kuchitsu's lens with any of different types of lenses, in this instance a lens with a desired focal length and/or magnification to have a projection angle of between 50 degrees to 100 degrees due to the fact that such a projection angle would provide a desired size of image on the scene/screen in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

28. **Claim 37** is rejected because:

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- A. Kuchitsu teach all claim limitations except that the generator has a depth of field of 100 mm to infinity in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
 - B. Kuchitsu's apparatus comprises a lens 4 (see Figure 1) to project structured light exiting the light guide on to a scene/screen in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
 - C. The Examiner takes official notice that in view of Kuchitsu's teaching of using a projection lens to project an image onto a scene/screen, it would have been obvious to one of ordinary skill in the art at the time the invention was made to select or substitute Kuchitsu's lens with any of different types of lenses, in this instance a lens with a desired depth of field, specifically a depth of field of 100 mm to infinity due to the fact that such depth of field would provide a focused image to be projected over a wide range of depth in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.
29. **Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tarsa et al (U.S. Patent 6,350,041 B1).**
30. **Claim 24** is rejected because:
- A. Kuchitsu teach all claim limitations except that at least one light source is located within the light guide, at a different depth to another light source in a structured light generator

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for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

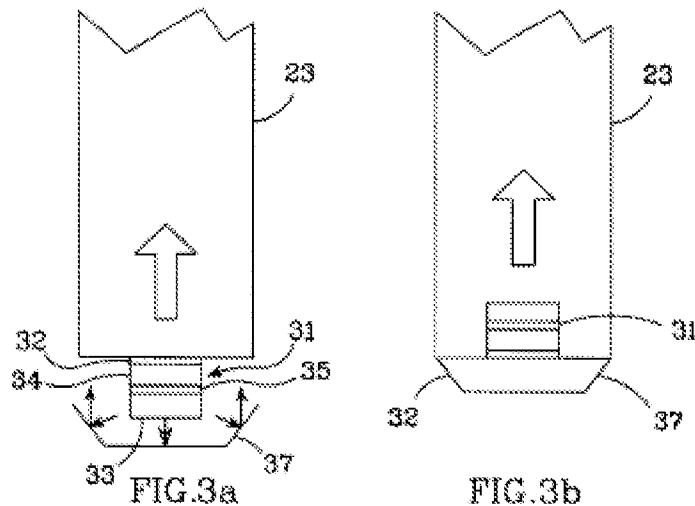
- B. Tarsa et al (Tarsa hereinafter) teaches of various locations at which light source(s) 31 may be placed/arranged (see col.5, line 34 - col.6, line 47; Figures 3a-3d), and specifically at least one light source 31 located within the light guide (see Figure 3b), in a structured light generator for projecting patterns of light (see col.3, lines 17-18) towards a scene.
- C. In view of Tarsa's teaching of having at least one light source located within the light guide and various other arrangements, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate any of the particular placement/arrangement of light source(s) as shown by Tarsa in Figures 3a-3d, *or a combination thereof*, to have one light source located within the light guide at a different depth to another light source, into Kuchitsu's apparatus due to the fact that it would provide an increased number of complex projection patterns in a structured light generator for projecting an array of distinct images/patterns of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

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Feb. 26, 2002

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US 6,350,041 B1



31. Claims 4, 7 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863).

32. Prior art Kuchitsu and Tiao uses the principle of kaleidoscope which is the same principle that is used in applicant's claimed invention.

A kaleidoscope generates symmetrical reflections of light.

Webster's II New Riverside University Dictionary defines "kaleidoscope" as "a tube-shaped optical instrument rotated to produce successive symmetric designs by means of mirrors reflecting the continuously changing patterns made by bits of colored glass at an end of the tube."

The applicant's claimed structure comprises three elements: a light source, a tube with reflective sides, and optics for projecting light on to a scene. Prior art Kuchitsu and Tiao have structures substantially similar to the applicant's claimed invention. The principle involved in

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the applicant's claimed invention and the prior art are the same – the principle of kaleidoscope, in which light from a light source entering one end of a tube having reflective walls generates symmetrical reflections of light inside the tube, and symmetrically reflected light exiting at the other end of the tube is projected toward a scene by an optical element.

Prior art Tiao characterizes the tube an “integrator” because it generates uniform light reflections. The *uniformity* of light is achieved by *symmetrical reflections of light*.

The applicant characterizes the tube a “structured light generator” because it generates *symmetrical reflections of light*.

33. **Claim 4** is rejected because:

- A. Kuchitsu teach all claim limitations except that the tube has a square cross section in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
- B. Tiao et al (Tiao hereinafter) teaches of an apparatus comprising a tube that has four walls and a rectangular cross section (see col.10, line 65 – col.11, line 15, and Figures 1B and 11; specifically col.11, line 10) in a structured light generator for projecting images of light source towards a screen/scene (see title and abstract, specifically image projection).
- C. In view of Tiao's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the triangular cross-section tube in Kuchitsu's apparatus with a square cross section tube due to the fact that a square cross-section would provide more light reflections and therefore more distinct light patterns

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projected onto a scene/screen in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

Note: It should be noted that a square is a special case of rectangle. Further, Tiao's condenser lens would qualify under the broad term of "projection optics."

34. **Claim 7** is rejected because:

- A. Kuchitsu teach all claim limitations except that the light guide comprises a tube of solid material adapted such that a substantial amount of light incident at an interface between the material of the tube and surrounding material undergoes total internal reflection in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
- B. Tiao et al (Tiao hereinafter) teaches of an apparatus comprising a tube that has four walls and a rectangular cross section (see col.10, line 65 – col.11, line 15, and Figures 1B and 11; specifically col.11, lines 3-6) in a structured light generator for projecting images of light source towards a screen/scene (see title and abstract, specifically image projection).
- C. In view of Tiao's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the triangular cross-section tube in Kuchitsu's apparatus with a tube of solid material due to the fact that a tube of solid material is easier to manufacture and maintain and therefore would provide cost savings in a structured light generator for projecting an array of distinct images of light source

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towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

35. **Claim 19** is rejected because:

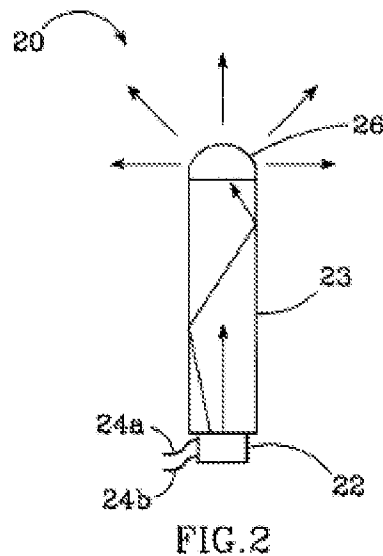
- A. Kuchitsu teach all claim limitations except that the light sources are arranged in a regular pattern in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.
- B. Tiao et al (Tiao hereinafter) teaches of an apparatus comprising light sources 50a, 202, 202a that are arranged in a regular pattern (see Figures 2A, 2B and 11) in a structured light generator for projecting images of light source towards a screen/scene (see title and abstract, specifically image projection).
- C. In view of Tiao's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate light sources arranged in a regular pattern into Kuchitsu's apparatus due to the fact that it would provide more complex light projection patterns from a source light pattern in a structured light generator for projecting an array of distinct images/patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

36. **Claims 10-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863) and further in view of Tarsa et al (U.S. Patent 6,350,041 B1).**

37. **Claim 10** is rejected because:

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- A. Kuchitsu and Tiao teach all claim limitations except that the tube of solid material is shaped at the output face to form a projection lens in a structured light generator for projecting images of light source towards a screen/scene.
- B. Tarsa et al (Tarsa hereinafter) teaches of an apparatus comprising a solid tube/light guide having an output face 26 to form a projection lens (see col.5, lines 13-27 – specifically lines 24-27, and Figure 2) in a structured light generator for projecting patterns of light (see col.3, lines 17-18) towards a scene.

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- C. In view of Tarsa's teaching of having an output face of a light guide to form a projection lens, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such a structure into Kuchitsu's and Tiao's teachings, specifically into Tiao's teaching, for having the output face of the light guide to form a projection lens due to the fact that such a combined/consolidated part would eliminate any lens versus tube alignment problems and provide cost savings due to having a single

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part in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

38. **Claim 11** is rejected because Tarsa teaches of a hemispherical projection lens 26 (see col.5, lines 13-27 – specifically lines 24-27, and Figures 2) at the output face of a light guide in a structured light generator for projecting patterns of light (see col.3, lines 17-18) towards a scene. In view of Tarsa's teaching of having a hemispherical projection lens at the output face of a light guide, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such a hemispherical projection lens into Kuchitsu's and Tiao's teachings, specifically into Kuchitsu's teaching, due to the fact that a hemispherical projection lens would provide a wider angle of projection for projecting larger size images in a structured light generator for projecting an array of distinct images of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

39. **Claim 12** is rejected because Tarsa teaches that centre of the hemispherical lens is located at the centre of the output face of the light guide (see Figures 2, 5a, 5b, 5c). In view of Tarsa's teaching of having a hemispherical projection lens located at the centre of the output face of the light guide, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate such a hemispherical projection lens at the centre of the output face of the light guide into Kuchitsu's and Tiao's teachings, specifically into Kuchitsu's teaching, due to the fact that a hemispherical projection lens at the centre of the output face of the light guide would provide a symmetrical pattern projected onto a scene with a structured light

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generator for projecting distinct images or patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

40. **Claim 13** is rejected for the same reasons of rejection of claim 12 and because it is obvious to one of ordinary skill in the art that when a hemispherical projection lens located at the centre of the output face of the light guide, as claimed in claim 12, an image or pattern projected towards the scene would have a common point of origin.

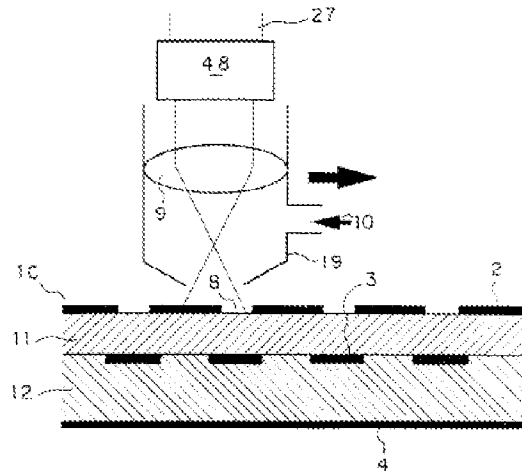
41. **Claims 5, 8 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863) and further in view of Kurosawa et al (U.S. Patent 6,373,026 B1).**

42. **Claims 5, 8 and 20** are rejected because:

A. Kuchitsu and Tiao teach all claim limitations except for (a) a specific cross sectional area of the light guide as claimed in claim 5, (b) a specific length of the light guide as claimed in claim 8, and (c) the light sources are arranged such that different arrangements of sources can be used to provide differing spot densities, in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

B. Kurosawa et al (Kurosawa hereinafter) teaches of an apparatus comprising a kaleidoscope 48 in which the light source and light guide dimensions of the kaleidoscope are selected to provide a desired spot sizes and therefore spot densities (see col.16, lines 1-4, lines 18-22, and Figure 15) in a structured light generator for projecting images of light source towards a scene.

FIG 15



C. In view of Kurosawa's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Kurosawa's teachings into Kuchitsu's apparatus due to the fact that it would provide an apparatus that can project precise light patterns onto a scene/screen in a structured light generator for projecting an array of distinct images/patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

43. Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kuchitsu (JP 62007019 A) in view of Tiao et al (U. S. Patent 6,318,863) and further in view of Shimomukai (U.S. Patent 5,757,548).

44. Claim 35 is rejected because:

A. Kuchitsu and Tiao teach all claim limitations except that a homogeniser is disposed between the light source and the mask, in a structured light generator for projecting an

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array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

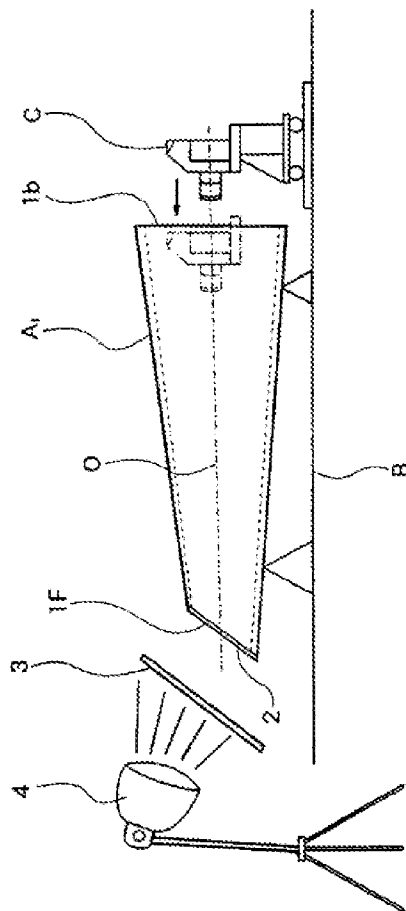
- B. Shimomukai teaches of an apparatus comprising a kaleidoscope in which a homogenizer/diffuser 3 (see abstract; col.6, lines 57-64; Figure 2) is disposed between the light source and the input face of the kaleidoscope, in a structured light generator for projecting an array of distinct images of light source towards a scene for displaying complex patterns of light on the scene for various purposes.

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C. In view of Shimomukai's teaching, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate Shimomukai's teachings into Kuchitsu's apparatus due to the fact that it would provide an apparatus that can project soft light patterns onto a scene/screen in a structured light generator for projecting an array of distinct soft images/patterns of light source towards a scene/screen for displaying complex patterns of light on the scene/screen for various purposes.

45. The Examiner has taken official notice in rejecting several claims as detailed above because the claimed subject matter is well-known in the art.

46. Several facts have been relied upon from the personal knowledge of the examiner about which the examiner took Official Notice in this office action. Applicant must seasonably challenge well known statements and statements based on personal knowledge when they are made. In re Selmi, 156 F.2d 96, 70 USPQ 197 (CCPA 1946); In re Fischer, 125 F.2d 725, 52 USPQ 473 (CCPA 1942). See also In re Boon, 439 F.2d 724, 169 USPQ 231 (CCPA 1971) (a challenge to the taking of judicial notice must contain adequate information or argument to create on its face a reasonable doubt regarding the circumstances justifying the judicial notice). If applicant does not seasonably traverse the well-known statement during examination, then the object of the well-known statement is taken to be admitted prior art. In re Chevenard, 139 F.2d 71, 60 USPQ 239 (CCPA 1943). A seasonable challenge constitutes a demand for evidence made as soon as practicable during prosecution. Thus, applicant is charged with rebutting the well-known statement in the **next reply** after the Office action in which the well known statement was made.

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47. Applicant's arguments presented in the papers filed on 06/16/2009 have been fully considered but they are moot in view of reasons detailed in paragraphs 6 - 9 above. The above stated reasons have necessitated the Examiner to make this office action **FINAL**. Please refer to MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

48. A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact/Status Information

49. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Roy M. Punnoose** whose telephone number is **(571)272-2427**.

The examiner can normally be reached on 9:30 AM - 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Tarifur R. Chowdhury** can be reached on **571-272-2287**. The **Fax** number for the organization where this application or proceeding is assigned is **571-273-8300**.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy M. Punnoose/
Primary Examiner
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